First Hit

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L1: Entry 1 of 2 File: JPAB Mar 9, 1993

*** TESTING *** DB=OPTX, PIECE=51 (J590)

PUB-NO: JP405058109A
DOCUMENT-IDENTIFIER: JP 05058109 A
TITLE: PNEUMATIC RADIAL TIRE

PUBN-DATE: March 9, 1993

INVENTOR-INFORMATION:
NAME COUNTRY
KURODA, YUKIO

ASSIGNEE-INFORMATION:
NAME COUNTRY
YOKOHAMA RUBBER CO LTD:THE

APPL-NO: JP03220373
APPL-DATE: August 30, 1991

US-CL-CURRENT: 152/560
INT-CL (IPC): B60C 9/08; B60C 11/00; B60C 11/04

ABSTRACT:

PURPOSE: To maintain the running performance on a dry road surface and enhance the running performance on a wet road surface by giving a specific value to the ratio of the radius of the continuing arc of circle at a tread center to that at the shoulder part, and furnishing the surface with grooves approaching the tire equator and reducing the width repetitively as heading the circumferential direction from the point on each circular arc where the carvature changes.

CONSTITUTION: A tread 1 is formed with a circular arc R2 at the shoulder part as continuing the circular arc in the center of tread radius R1, wherein their ratio R1/R2 shall range between 3.0-3.5. The distance along the circular arc from the tire equation M at the curvature changing point X where the two first named circular arcs intersect shall be 20-30% of the tread spread width TDW. Grooves 2 approaching the wire equator M and reducing the width are formed repetitively toward the point Y in the tire circumferential direction from the curvature changing point X, wherein the distances of projecting points X', Y' of points X, Y to the tire equator M shall be 5-15% of the tire circumference length and 100-300% of the circumferential direction length of the tire grounding shape while the distance of the point Y from the equator M be 40-60% of the distance between X and X'. Thereby the running performance on a dry road surface can be well maintained, and the running performance on a wet road surface be enhanced.

First Hit

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L1: Entry 2 of 2 File: DWPI Mar 9, 1993

*** TESTING *** DB=OPTX, PIECE=32 (D193)

DERWENT-ACC-NO: 1993-120981
DERWENT-WEEK: 199315

TITLE: High speed car radial tyre having improved wet performance without sacrificing dry performance - having a tread profile formed with two circular axes on the meridional cross=section

PATENT-ASSIGNEE:

ASSIGNEE	CODE
YOKOHAMA RUBBER CO LTD	YOKO

PRIORITY-DATA: 1991JP-0220373 (August 30, 1991)

Search Selected | Search ALL | Clear

PATENT-FAMILY:

	PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
☐	JP 05058109 A	March 9, 1993		004	B60C009/08

APPLICATION-DATA:

PUB-NO	APPL-DATE	APPL-NO	DESCRIPTOR
JP 05058109A	August 30, 1991	1991JP-0220373	

INT-CL (IPC): B60C 9/08; B60C 11/04

ABSTRACTED-PUB-NO: JP 05058109A
BASIC-ABSTRACT:

On the meridinal cross-section, the tread profile is formed with two circular arcs, one with radius R1 for the central region and the other with radius R2 for the shoulder region. The ratio R1/R2 is made to be 3.0 to 3.5 and the intersection point X is distanced 0.2 to 0.3 times the tread developed width (TDW) from the tyre equator M. In plan view of the tread surface, repeated circular or straight grooves are provided from points X to Y with decreasing width, X' and Y' are the projections of X and Y to the tyre equator M respectively, the length X'Y' is 5 to 15% of the tyre's round length and is 1.0 to 3.0 times the circumferential length of the ground contact figure. The distance YY; is 40 to 60% of the distance XX'.

ADVANTAGE - The wet performance is improved without sacrificing the dry performance. The tyre is good as a semi-racing tyre.

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特開平5－58109

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(51)Int.Cl.[5]	識別記号	庁内整理番号	ＦＩ	技術表示箇所
Ｂ６０Ｃ　9/08		Ｈ　8408－3D		
11/00		Ｆ　8408－3D		
11/04		Ｄ　8408－3D		

審査請求　未請求　請求項の数１(全　４　頁)

(21)出願番号　特願平3－220373

(22)出願日　平成３年(1991)８月30日

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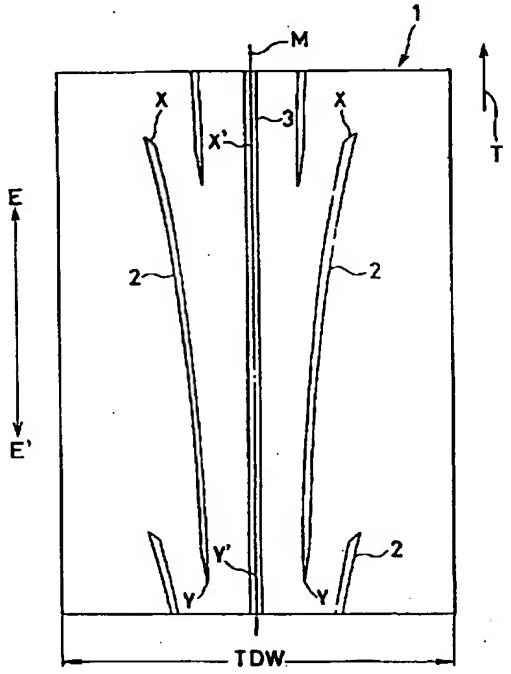
(54)【発明の名称】　空気入りラジアルタイヤ

(57)【要約】　（修正有）

【目的】　乾燥路走行性能を実質的に低下させることなしに湿潤路走行性能を向上させる。

【構成】　タイヤ子午線方向断面におけるトレッド表面のセンター部をトレッドラジアスR_1の円弧で形成すると共に、センター部に連続するトレッド表面のショルダー部をトレッドラジアスR_2の円弧で形成し、比R_1／R_2を3.0～3.5とし、これら２つの円弧が交差する変曲点Ｘのタイヤ赤道線からの距離をトレッド展開幅ＴＤＷの20%～30%とし、かつ、平面視のトレッド表面に変曲点Ｘからタイヤ周方向のＹ点に向けてタイヤ赤道線に徐々に近づきかつ幅が徐々に狭くなる円弧状又は直線状の溝をタイヤ周方向に繰り返し設け、変曲点Ｘ及びＹ点のタイヤ赤道線に対する投影点を各々Ｘ'，Ｙ'とするとき、点Ｘ'－Ｙ'間の距離をタイヤ周長の５～15%であると共に、タイヤ接地形状のタイヤ周方向長さの100～300 %の範囲にし、Ｙ点のタイヤ赤道線からの距離をＸ'－Ｘ間の距離の40%～60%にする。



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【特許請求の範囲】

【請求項1】　タイヤ子午線方向断面におけるトレッド表面のセンター部をトレッドラジアスR_1の円弧で形成すると共に、前記センター部に連続するトレッド表面のショルダー部をトレッドラジアスR_2の円弧で形成し、R_1とR_2との比R_1/R_2を3.0～3.5とし、これら2つの円弧が交差する変曲点Xのタイヤ赤道線からの距離をトレッド展開幅TDWの20%～30%とし、かつ、平面視のトレッド表面に前記変曲点Xからタイヤ周方向のY点に向けてタイヤ赤道線に徐々に近づきかつ幅が徐々に狭くなる円弧状又は直線状の溝をタイヤ周方向に繰り返し設け、前記変曲点XおよびY点のタイヤ赤道線に対する投影点をそれぞれX'，Y'とするとき、点X'－Y'間の距離をタイヤ周長の5～15%であると共に、タイヤ接地形状のタイヤ周方向長さの100～300%の範囲にし、前記Y点のタイヤ赤道線からの距離を前記X'－X間の距離の40%～60%にした空気入りラジアルタイヤ。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、乾燥路走行性能を犠牲にすることなしに湿潤路走行性能を向上させた空気入りラジアルタイヤ、特にセミレーシングタイヤ等の高速走行用空気入りラジアルタイヤに関する。

【0002】

【従来の技術】一般に排水性を高めて湿潤路走行性能を向上させるためにトレッド表面の溝面積比率を大きくすると、トレッド表面の接地面積が減少してグリップ力が小さくなり乾燥路走行性能が低下してしまう。このため、JISマークが付けられて一般路でも走行できる設計になっているジムカーナーなどのセミレーシングタイヤ等の高速走行用空気入りラジアルタイヤでは、乾燥路走行性能を重視してトレッドパターンをスリックパターンに近くし、トレッド表面の溝面積比率を減少させてきた。しかし、このようなタイヤでは排水性が悪く、湿潤路を高速走行するに際してハイドロプレーニングが生じるという問題があった。

【0003】

【発明が解決しようとする課題】本発明は、乾燥路走行性能を実質的に低下させることなしに湿潤路走行性能を向上させた空気入りラジアルタイヤを提供することを目的とする。

【0004】

【課題を解決するための手段】本発明の空気入りラジアルタイヤは、タイヤ子午線方向断面におけるトレッド表面のセンター部をトレッドラジアスR_1の円弧で形成すると共に、前記センター部に連続するトレッド表面のショルダー部をトレッドラジアスR_2の円弧で形成し、R_1とR_2との比R_1/R_2を3.0～3.5とし、これら2つの円弧が交差する変曲点Xのタイヤ赤道線からの距離

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をトレッド展開幅TDWの20%～30%とし、かつ、平面視のトレッド表面に前記変曲点Xからタイヤ周方向のY点に向けてタイヤ赤道線に徐々に近づきかつ幅が徐々に狭くなる円弧状又は直線状の溝をタイヤ周方向に繰り返し設け、前記変曲点XおよびY点のタイヤ赤道線に対する投影点をそれぞれX'，Y'とするとき、点X'－Y'間の距離をタイヤ周長の5～15%であると共に、タイヤ接地形状のタイヤ周方向長さの100～300%の範囲にし、前記Y点のタイヤ赤道線からの距離を前記X'－X間の距離の40%～60%にしたことを特徴とする。

【0005】このように本発明では、X、X'、Y、Y'を関係づけ、この関係をタイヤ周上繰り返すことによりタイヤ赤道線を中心とする線対称パターンをトレッド表面に形成したために、溝面積比率を高めることなしに排水性を高めることができるので背反関係にある乾燥路走行性能と湿潤路走行性能とを共に向上させることが可能となる。なお、本発明では、タイヤの接地条件は標準空気圧、標準荷重下とする。

【0006】以下、図を参照して本発明の構成につき詳しく説明する。

①　本発明では、本発明の空気入りラジアルタイヤの子午線方向断面を示した図1におけるように、タイヤ子午線方向断面において、トレッド表面1のセンター部をトレッドラジアスR_1の円弧で形成すると共に、このセンター部に連続するトレッド表面1のショルダー部をトレッドラジアスR_2の円弧で形成する。ここで、R_1とR_2との比R_1/R_2を3.0～3.5とする。この比が3.5よりも大きいと接地形状が幅広になるかわりに接地面圧分布がショルダー部へ移動し、排水効果を低くしてしまう。一方、3.0よりも小さいと接地幅が減少し、操縦安定性の面で本来の乾燥路走行性能を発揮しにくくなってしまう。

【0007】また、トレッドラジアスR_1の円弧とトレッドラジアスR_2の円弧とが交差する位置を変曲点Xとして、この変曲点Xのタイヤ赤道線Mからのトレッドラジアスの円弧に沿った距離を、トレッド展開幅TDWの20%～30%とする（0.4×TDW/2～0.6×TDW/2）。好ましくは25%とする。20%未満では接地幅が減少し、本来の目的である接地部分の確保（乾燥路走行性能のため）が不十分となり、接地圧分布が幅方向中心に偏り、偏摩耗の原因にもなる。30%を超えると接地面圧分布がショルダー部へ移動することから排水効果が減少してしまうと同時にトレッドラジアスが急激に変化することから操縦安定性が低下してしまう。

【0008】②　さらに、本発明では、平面視のトレッド表面において、変曲点Xからタイヤ周方向のY点に向けてタイヤ赤道線に徐々に近づきかつ幅が徐々に狭くなる円弧状又は直線状の溝を設け、変曲点XおよびY点のタイヤ赤道線に対する投影点をそれぞれX'，Y'とするとき、点X'－Y'間の距離をタイヤ周長の5～15%

であると共に、タイヤ接地形状のタイヤ周方向長さの100～300％の範囲にし、前記Y点のタイヤ赤道線からの距離を前記X'－X間の距離の40%～60%にしている。すなわち、トレッド表面の要部を示した図2におけるように、変曲点Xのタイヤ赤道線Mへの投影点をX'とし、投影点X'からタイヤ赤道線M上でタイヤ周長の5～15%の範囲および周方向接地長（タイヤ接地形状のタイヤ周方向長さ、フットプリントのタイヤ周方向長さに相当）の100～300％の範囲で離れた位置をY'とし、Y'からタイヤ赤道線Mに対し垂直にショルダー一部方向に投影点X'－変曲点Xの距離の40%～60%離れた位置をYとし、XからYにかけて幅が徐々に狭くなる円弧状又は直線状の溝2をタイヤ赤道線Mに徐々に近づずくように設けている。

【0009】Y'をタイヤ赤道線M上で投影点X'からタイヤ周長の5～15%の範囲で離れた位置としたのは、5％未満では溝2が短くなって接地長範囲に閉鎖され、排水効果を失う所が生じることになり、15%を超えると先細りの溝2の細い部分が多い所でやはり排水効果を失うからである。また、Y'をこのようにタイヤ周長の5～15%の範囲で離れた位置であって、周方向接地長の100～300％の範囲で離れた位置としたのは、100%未満の場合には溝2が閉鎖されて排水効果を失う所が生じることになり、300％を超えると溝2の周方向要素が強まり、特にショルダーエッジ部側および斜め方向への排水効果が低下するからである。

【0010】また、Yをタイヤ赤道線Mに対し、Y'から垂直にショルダー一部方向に投影点X'－変曲点Xの距離の40%～60%離れた位置としたのは、40%未満ではセンター部のトレッド剛性が落ちて操縦安定性に影響を及ぼすと同時に偏摩耗の原因にもなり、60%を超えると溝2の周方向要素が強まり、特にショルダーエッジ部側および斜め方向への排水効果が低下するからである。

【0011】溝2の幅をXからYにかけて徐々に狭くしたのは、溝2に浸入した水が溝外に出易くするためである。このために、また、XとYとを結ぶ直線とXを通る溝2の中心線とがX点においてなす角度θを0°～30°とするのが好ましい。さらに、Y点における溝2の幅を最小限1.0 ㎜まで狭くするのが好ましい。また、いっそう排水性を高めるために、タイヤ赤道線M上に幅5～10 ㎜ 程度の直線状主溝3を設けるのが好ましい。

【0012】③　そのうえ本発明では、この円弧状又は直線状の溝2をタイヤ周方向に繰り返し設ける。すなわち、これらX、X'、Y、Y'の関係をタイヤ周上繰り返す。具体的には、変曲点Xのタイヤ赤道線Mへの投影点X'とY点のタイヤ赤道線Mへの投影点Y'との間の長さ（投影点X'－投影点Y'）を1ピッチとし、この1ピッチのパターンをタイヤ1周に亘って周方向に複数回繰り返してトレッドパターンを構成する。この場合、1ピッチのパターン同士が部分的に重なってもよい。その重なり部分の周方向長さは、1ピッチの長さの0%～20%の範囲であるのがよい。また、1ピッチのパターンの複数回の繰り返しによるパターン周方向合計長さがタイヤ周長の100％～180％の範囲となるのが好ましい。このトレッドパターンの一例を図3に示す。

【0013】図3において、トレッド表面1にはタイヤ赤道線M上にタイヤ周方向EE'にタイヤ1周に亘って直線状主溝3が設けられている。また、タイヤ赤道線Mを中心として左右対称に、XからYにかけて幅が徐々に狭くなる円弧状の溝2が設けられている。トレッド表面1における溝面積比率は8～12%である。このようにしてなるトレッドパターンを有するタイヤは、トレッド表面が路面側からみて進行方向Tに対して図3のパターンとなるように車両に装着される（Xが前方、Yが後方）。

【0014】

【実施例】タイヤサイズ 204/60 R14 の図3のトレッドパターンを有する空気入りラジアルタイヤを作製した（本発明タイヤ）。ここで、正規内圧および正規荷重下において、$R_1/R_2=3.2$、変曲点Xのタイヤ赤道線Mからの距離＝トレッド展開幅TDWの半分の50%、X'－Y'間の長さ（1ピッチ）＝タイヤ周長の10%および周方向接地長の150％、Y'－Y間の距離＝X'－X間の距離の50%、溝2のX点における幅＝9.0 ㎜、溝2のY点における幅＝1.0㎜、θ＝20°、直線状主溝3の幅＝7.0 ㎜、1ピッチのパターンのタイヤ1周に亘る周方向EE'の繰り返し回数＝10回、溝面積比率＝10%とした。

【0015】この本発明タイヤで乾燥路走行性能および湿潤路走行性能を評価した。この結果を図4にaで示す。また、比較のために、タイヤサイズ 205/60 R14 であって、トレッド表面に3本の直線状周方向主溝（タイヤ赤道線上に1本、タイヤ赤道線を中心として左右対称にタイヤ赤道線とショルダー一部端との中間にそれぞれ1本）を有するだけの従来のセミレーシングタイヤについて、溝面積比率を5％～15%まで変化させて乾燥路走行性能および湿潤路走行性能を評価した。この場合、3本の直線状周方向主溝の深さをそれぞれ4.5 ㎜とし、タイヤ赤道線上の直線状周方向主溝の幅を7.0 ㎜として、残りの2本の直線状周方向主溝の幅を変化させることにより溝面積比率を調整した。この結果を図4に示す。図4において、bはセミレーシングタイヤの湿潤路走行性能の変化を、cはセミレーシングタイヤの乾燥路走行性能の変化をそれぞれ表わす。

【0016】乾燥路走行性能の評価方法：ドライ状況でのサーキット区間タイムおよびラップタイムと操縦安定性で評価した。この結果を図4に指数で示す。

湿潤路走行性能の評価方法：水深3～5㎜の湿潤地帯を10 ㎞/h 毎に速度を上げながら通過し、そのときのハイドロプレーニング発生速度とエンジン回転数の上昇とを

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フィーリングで評価した。この結果を図4に指数で示す。図4から、本発明タイヤが乾燥路走行性能と湿潤路走行性能の両方において優れていることが判る。

【0017】

【発明の効果】以上説明したように本発明によれば、X、X'、Y、Y'を関係づけ、この関係をタイヤ周上繰り返したために、乾燥路走行性能を実質的に低下させることなしに湿潤路走行性能を向上させることが可能となる。本発明は、特にセミレーシングタイヤ等の高速走行用空気入りラジアルタイヤとして有用である。

【図面の簡単な説明】

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【図1】本発明の空気入りラジアルタイヤの子午線方向断面を示した説明図である。

【図2】本発明の空気入りラジアルタイヤのトレッド表面の要部を示した平面視説明図である。

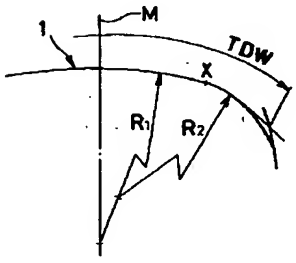
【図3】本発明の空気入りラジアルタイヤのトレッド表面のトレッドパターンの一例の平面図である。

【図4】溝面積比率と乾燥路走行性能および湿潤路走行性能との関係図である。

【符号の説明】

1　トレッド表面、　2　溝、　3　直線状主溝。

【図1】



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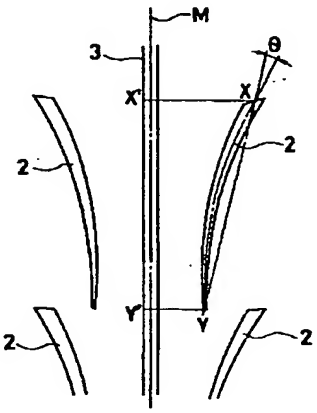
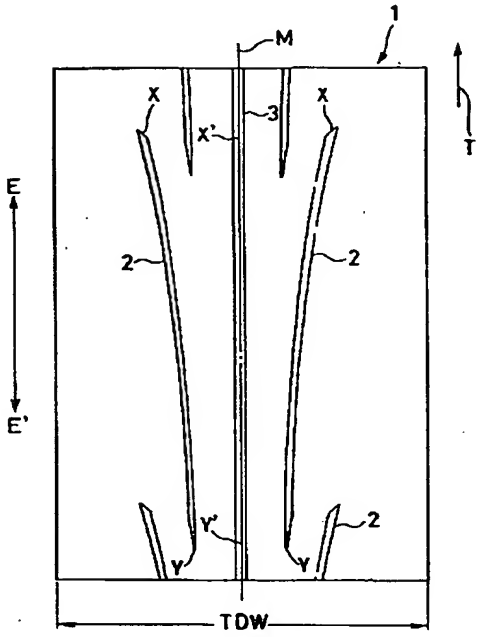
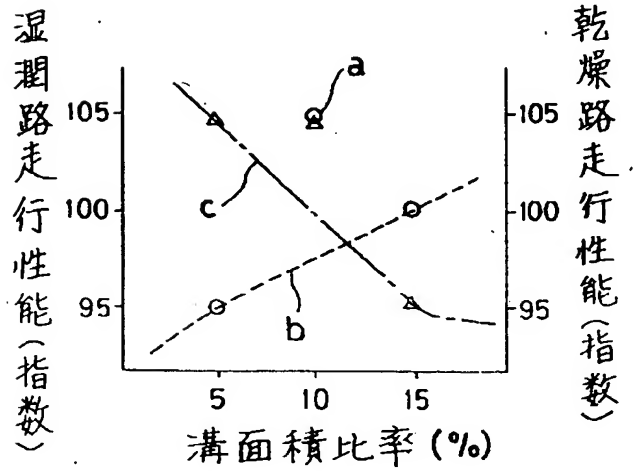


【図3】



【図4】



* NOTICES * machine translation for Japan 5-58109

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to radial-ply tires containing air for high-speed transit, such as a radial-ply tire containing air which raised humid way performance-traverse ability, especially a semi racing tire, without sacrificing desiccation way performance-traverse ability.
[0002]
[Description of the Prior Art] If the groove surface product ratio on the surface of a tread is enlarged in order to raise wastewater nature generally and to raise humid way performance-traverse ability, the crawler bearing area on the surface of a tread will decrease, the grip force will become small, and desiccation way performance-traverse ability will fall. For this reason, JIS With radial-ply tires containing air for high-speed transit, such as semi racing tires, such as a gymkhana which is the layout a mark is attached and it can run also on a general way, desiccation way performance-traverse ability is thought as important, near of the tread pattern is carried out to a slick pattern, and the groove surface product ratio on the surface of a tread has been decreased. However, with such a tire, wastewater nature was bad and there was a problem that faced carrying out high-speed transit of the humid way, and hydroplaning arose.
[0003]
[Problem(s) to be Solved by the Invention] This invention aims at offering the radial-ply tire containing air which raised humid way performance-traverse ability, without reducing desiccation way performance-traverse ability substantially.
[0004]
[Means for Solving the Problem] A radial-ply tire containing air of this invention is tread RAJIASU R1 about the pin center,large section on the surface of a tread in the direction cross section of the tire meridian. While forming with a circle It is tread RAJIASU R2 about the shoulder section on the surface of a tread which follows said pin center,large section. It forms with a circle. R1 R2 A ratio R1 / R2 3.0-3.5 Carry out and distance from the tire equator line of the point of inflection X where these two circles cross is made into 20% - 30% of the tread developed width TDW. A slot of the shape of circular or a straight line is repeated and established in a tire hoop direction. and on the tread surface of plane view, towards Y points of said point of inflection X to a tire hoop direction, the tire equator line is approached gradually and width of face becomes narrow gradually -- X' and when considering as Y', while being 5 - 15% of the tire perimeter about distance between point X'-Y', said point of inflection X and a projecting point over the tire equator line of Y points, respectively It is characterized by having made it the range of 100 of the tire hoop direction length of a tire touch-down configuration - 300 %, and making distance from said tire equator line of Y points into 40% - 60% of distance between said X'-X.
[0005] Thus, in this invention, since an axial symmetry pattern centering on the tire equator line was formed in the tread surface X, X', and by connecting Y and Y' and repeating this relation on a tire periphery, and wastewater nature can be raised, without raising a groove surface product ratio, it becomes possible to raise both desiccation way performance-traverse ability which has a rebellion relation, and humid way performance-traverse ability. In addition, touch-down conditions of a tire are made into the bottom of standard pneumatic pressure and a standard load in this invention.
[0006] Hereafter, with reference to drawing, it explains in detail per configuration of this invention.
** As in drawing 1 which showed the direction cross section of the meridian of a radial-ply tire containing air of this invention by this invention, set in the direction cross section of the tire meridian, and it is tread RAJIASU R1 about the pin center,large section on the surface 1 of a tread. It is tread RAJIASU R2 about the shoulder section on the surface 1 of a tread which follows this pin center,large section while forming with a circle. It forms with a circle. Here, it is R1. R2 A ratio R1 / R2 3.0-3.5 It carries out. This ratio is 3.5. Instead of a touch-down configuration becoming broad if large, touch-down planar pressure distribution will move to the shoulder section, and will make the wastewater effect low. On the other hand, it is 3.0. If small, touch-down width of face decreases and it will be hard coming to demonstrate desiccation way performance-traverse ability original in a field of driving stability.
[0007] Moreover, tread RAJIASU R1 A circle and tread RAJIASU R2 Distance in alignment with a circle of tread RAJIASU from the tire equator line M of this point of inflection X is made into 20% - 30% of the tread developed width TDW by making into point of inflection X a location where a circle crosses (0.4 xTDW/2 -0.6 xTDW/2). It may be 25% preferably. At less than 20%, touch-down width of face decreases, it becomes inadequate (since it is desiccation way performance-traverse ability) securing [of a touch-down portion which is the original purpose], and contact pressure distribution causes a bias and partial

wear centering on the cross direction. Since tread RAJIASU changes rapidly at the same time the wastewater effect will decrease, since touch-down planar pressure distribution will move to the shoulder section, if it exceeds 30%, driving stability will fall.
[0008] ** Prepare a slot of the shape of circular or a straight line. further, in the tread surface of plane view, towards Y points of point of inflection X to a tire hoop direction, the tire equator line is approached gradually and width of face becomes narrow gradually by this invention -- X' and when considering as Y', while being 5 - 15% of the tire perimeter about distance between point X'-Y', point of inflection X and a projecting point over the tire equator line of Y points, respectively It is made the range of 100 of the tire hoop direction length of a tire touch-down configuration - 300 %, and distance from said tire equator line of Y points is made into 40% - 60% of distance between said X'-X. Namely, a projecting point to the tire equator line M of point of inflection X is made into X' as in drawing 2 which showed an important section on the surface of a tread. It is 5 - 15% of range and hoop direction touch-down length (in tire hoop direction length of a tire touch-down configuration) of the tire perimeter on projecting point X' to] the tire equator line M. It is a location left in the range of 100 [being considerable] - 300 % to the tire hoop direction length of a footprint Y' It carries out. the tire equator line M from Y' -- receiving -- perpendicular -- the direction of the shoulder section -- projecting point X' -- the slot 2 of the shape of circular or a straight line where a location which distance of the - point of inflection X left 40% to 60% is set to Y, it applies to Y from X, and width of face becomes narrow gradually -- the tire equator line M -- gradually -- ******** -- it has prepared like.
[0009] Y ' made into the location distant from projecting point X' in 5 - 15% of range of the tire perimeter on the tire equator line M because a wastewater effect will lose too at less than 5 % in a place with many the thin portions of the slot 2 on tapering, if a slot 2 becomes short, a touch-down length range is closed down, the place which loses the wastewater effect will be generated and it exceeds 15 %. Moreover, being the location which left Y' in 5 - 15% of range of the tire perimeter in this way, and having considered as a location distant in the range of 100 of hoop direction touch-down length - 300 % It is because a hoop direction element of a slot 2 will become strong and the wastewater effect to a shoulder edge section side and the direction of slant will fall especially, if a place which a slot 2 is closed at less than 100% of case, and loses the wastewater effect will be generated and 300 % is exceeded.
[0010] Moreover, having considered as a location where distance of projecting point X'-point-of-inflection X separated Y from Y' 40% to 60% in the direction of the shoulder section perpendicularly to the tire equator line M It is because a hoop direction element of a slot 2 will become strong and the wastewater effect to a shoulder edge section side and the direction of slant will fall especially at less than 40%, if it also becomes the cause of partial wear and exceeds 60% at the same time the tread rigidity of the pin center,large section falls and it affects driving stability.
[0011] It narrowed gradually from X for making it easy to come out of out of a water fang furrow which infiltrated into a slot 2, having applied [of a slot 2] it to Y. for this reason -- moreover, it is desirable that a straight line which connects X and Y, and a center line of the slot 2 which passes along X make the angle theta made in X point 0 degree - 30 degrees. Furthermore, it is desirable to narrow width of face of the slot 2 in Y points to minimum 1.0 mm. Moreover, in order to raise wastewater nature further, they are width of face 5 - 10 mm on the tire equator line M. It is desirable to form the straight line-like major groove 3 of a degree.
[0012] ** Moreover, repeat and establish this slot 2 of the shape of circular or a straight line in a tire hoop direction by this invention. That is, relation of these X, X', Y, and Y' is repeated on a tire periphery. concrete -- point of inflection -- X -- a tire -- the equator line -- M -- projection -- a point -- X -- ' -- Y -- a point -- a tire -- the equator line -- M -- projection -- a point -- Y -- ' -- between -- length (projecting [projecting point X'-] point Y') -- one pitch -- carrying out -- a pattern of this one pitch -- 1 round of tires -- continuing -- a hoop direction -- two or more times -- repeating -- a tread pattern -- constituting . In this case, the patterns of one pitch may lap partially. As for the hoop direction length of the lap portion, it is good that it is 0% - 20% of range of the length of one pitch. Moreover, it is desirable that pattern hoop direction sum total length by repeat of multiple times of a pattern of one pitch serves as the range of 100 % of the tire perimeter - 180 %. An example of this tread pattern is shown in drawing 3 .
[0013] In drawing 3 , on the tire equator line M, 1 round of tires is covered at tire hoop direction EE' at the tread surface 1, and the straight line-like major groove 3 is formed. Moreover, the circle-like slot 2 where it applies to bilateral symmetry from X focusing on the tire equator line M at Y, and width of face becomes narrow gradually is formed. A groove surface product ratio in the tread surface 1 is 8 - 12%. Thus, vehicles are equipped with a tire which has a becoming tread pattern so that the tread surface may serve as a pattern of drawing 3 to a travelling direction T, in view of a road surface side (X is the front and Y is back).
[0014]
[Example] Tire size 204/60 R14 The radial-ply tire containing air which has the tread pattern of drawing 3 was produced (this invention tire). It sets under normal internal pressure and a normal load here. R1/R2 =3.2, Distance from the tire equator line M of point of inflection X = 50% of the one half of the tread developed width TDW Length between X'-Y' (one pitch) = 150 % of the 10% and the hoop direction touch-down length of the tire perimeter, Width-of-face =9.0 mm in X point of 50% of the distance between Y'distance =Xbetween -Y'-X, and a slot 2, The count =of repeat 10 time of hoop direction EE' covering 1 round of tires of the pattern of width-of-face =1.0mm in Y points of a slot 2, theta= 20 degrees, width-of-face =7.0 mm of the straight line-like major groove 3, and one pitch, a groove surface product ratio = it could be 10%.
[0015] This this invention tire estimated desiccation way performance-traverse ability and humid way performance-traverse ability. a shows this result to drawing 4 . moreover, a comparison sake -- tire size 205/60 R14 it is -- About the conventional semi racing tire which has a three straight line-like hoop direction major groove (it is one to the middle of the tire equator line and shoulder **** in bilateral symmetry focusing on 1 and the tire equator line on the tire equator line, respectively) on the tread

surface The groove surface product ratio was changed from 5% to 15%, and desiccation way performance-traverse ability and humid way performance-traverse ability were evaluated. In this case, the depth of a three straight line-like hoop direction major groove was set to 4.5 mm, respectively, and the groove surface product ratio was adjusted by changing the width of face of the remaining two straight line-like hoop direction major groove by setting width of face of the straight line-like hoop direction major groove on the tire equator line to 7.0 mm. This result is shown in drawing 4 . In drawing 4 , b expresses change of the humid way performance-traverse ability of a semi racing tire, and c expresses change of the desiccation way performance-traverse ability of a semi racing tire, respectively.

[0016] The evaluation method of desiccation way performance-traverse ability: The circuit section time and the lap time, and driving stability in a dry condition estimated. A characteristic shows this result to drawing 4 .

evaluation method [of humid way performance-traverse ability]: -- a humid zone with a depth of 3-5mm -- 10 km/h every -- it passed gathering speed and the hydroplaning generating speed at that time and the rise of an engine speed were evaluated with the feeling. A characteristic shows this result to drawing 4 . Drawing 4 shows that this invention tire is excellent in both desiccation way performance-traverse ability and humid way performance-traverse ability.

[0017]

[Effect of the Invention] It becomes possible to raise humid way performance-traverse ability, without reducing desiccation way performance-traverse ability substantially according to this invention, since it connected Y and Y' and this relation was repeated on the tire periphery, X, X', and as explained above. Especially this invention is useful as radial-ply tires containing air for high-speed transit, such as a semi racing tire.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] It is tread RAJIASU R1 about the pin center,large section on the surface of a tread in the direction cross section of the tire meridian. While forming with a circle It is tread RAJIASU R2 about the shoulder section on the surface of a tread which follows said pin center,large section. It forms with a circle. R1 R2 A ratio R1 / R2 3.0-3.5 Carry out and distance from the tire equator line of point of inflection X where these two circles cross is made into 20% - 30% of tread developed width TDW. A slot of the shape of circular or a straight line is repeated and established in a tire hoop direction. and on the tread surface of plane view, towards Y points of said point of inflection X to a tire hoop direction, the tire equator line is approached gradually and width of face becomes narrow gradually -- X' and when considering as Y', while being 5 - 15% of the tire perimeter about distance between point X'-Y', said point of inflection X and a projecting point over the tire equator line of Y points, respectively A radial-ply tire containing air which made it the range of 100 of the tire hoop direction length of a tire touch-down configuration - 300 %, and made distance from said tire equator line of Y points 40% - 60% of distance between said X'-X.

[Translation done.]